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EXAMINER	
LLOYD, EMILY M	
ART UNIT	**PAPER NUMBER**
3736	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/549,732	THOMAS, MATTHEW JAMES	
	Examiner	Art Unit	
	Emily M. Lloyd	3736	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 September 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *See Continuation Sheet*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :01/17/2006, 02/21/2006, 08/08/2006.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: page 4 lines 26-29 should be revised for clarity; page 8 line 11 "an" should be inserted before "apparatus"; page 10 line 10 should be revised for clarity.

Appropriate correction is required.

Claim Objections

2. Claims 3 and 11-18 are objected to because of the following informalities: claims 3 and 12 use "as herein defined" instead of providing the details or names of the instantaneous algorithm(s) claimed; and claims 11-18 should start with "An" or "The" so that the claims form complete sentences. Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 3-4, 10, and 12-13 are rejected under 35 U.S.C. 102(b) as being anticipated by "Phasic and Tonic Coupling between EEG and EMG Demonstrated with Independent Component Analysis" (McKeown et al.).

Regarding claim 1, McKeown et al. disclose a method of monitoring electrical muscular activity non-invasively (pg 48 Data Collection first paragraph lines 3-6), the muscular activity being stationary or non-stationary (pg 49 Tasks), and the method

including the steps of: a) providing a signal separation technique suitable for separating stationary signals (pgs 47-48 Independent Component Analysis), b) placing a plurality of low-noise signal electrodes externally upon a patient's skin for detection of muscular activity (pgs 48-49 Data Collection paragraphs 2-3), the signal electrodes being localised sufficiently such that: i) their muscular signal contributions simulate a single muscular source to the signal separation technique despite any non-stationarity of the muscular source (pg 46 left column lines 20-27), and ii) the number of sources detected by the signal separation technique is not more than the number of signal electrodes (pg 55 right column lines 38-41); and c) applying the signal separation technique to signals received from the signal electrodes to separate the muscular source (pg 47 Independent Component Analysis first paragraph lines 4-9).

Regarding claim 10, McKeown et al. disclose an apparatus for monitoring electrical muscular activity non-invasively (pg 48 Data Collection first paragraph lines 3-6), the muscular activity being stationary or non-stationary (pg 49 Tasks), the apparatus comprising: a) computer apparatus for implementing a signal separation technique suitable for separating stationary signals (pg 50 Results second paragraph lines 1-5 and pgs 47-48 Independent Component Analysis), b) a plurality of low-noise signal electrodes for placing externally upon a patient's skin for detection of muscular activity (pgs 48-49 Data Collection), the signal electrodes being suitable for localisation sufficiently such that: i) their muscular signal contributions will simulate a single muscular source to the signal separation technique despite any non-stationarity of the muscular source (pg 46 left column lines 20-27), and ii) the number of sources detected

by the signal separation technique will not be more than the number of signal electrodes (pg 55 right column lines 38-41); and c) processing means for processing signals received from the signal electrodes into digital signals suitable for application of the signal separation technique by the computer apparatus to separate the muscular source (pg 50 Results second paragraph lines 1-5 and pg 47 Independent Component Analysis first paragraph lines 4-9).

Regarding claims 3-4 and 12-13, McKeown et al. disclose a method according to claim 1 and an apparatus according to claim 10, wherein the signal separation technique is based on an instantaneous algorithm, and the instantaneous algorithm is independent component analysis (ICA) (pgs 47-48 Independent Component Analysis).

5. Claims 1-2, 6, 10-11, and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by United States Patent 5483970 (Rosenburg).

Regarding claim 1, Rosenburg discloses a method of monitoring electrical muscular activity non-invasively (Column 7 lines 24-26), the muscular activity being stationary or non-stationary, and the method including the steps of: a) providing a signal separation technique suitable for separating stationary signals (Column 9 line 44 – Column 10 line 6), b) placing a plurality of low-noise signal electrodes externally upon a patient's skin for detection of muscular activity (Column 7 lines 24-26), the signal electrodes being localised sufficiently such that: i) their muscular signal contributions simulate a single muscular source to the signal separation technique despite any non-stationarity of the muscular source, and ii) the number of sources detected by the signal separation technique is not more than the number of signal electrodes; and c) applying

the signal separation technique to signals received from the signal electrodes to separate the muscular source (Column 9 line 44 – Column 10 line 6).

Regarding claim 10, Rosenburg discloses an apparatus for monitoring electrical muscular activity non-invasively, the muscular activity being stationary or non-stationary, the apparatus comprising: a) computer apparatus for implementing a signal separation technique suitable for separating stationary signals (signal processor 16 Figure 1A), b) a plurality of low-noise signal electrodes for placing externally upon a patient's skin for detection of muscular activity (electrodes E1-En Figure 1A, also Figure 7B), the signal electrodes being suitable for localisation sufficiently such that: i) their muscular signal contributions will simulate a single muscular source to the signal separation technique despite any non-stationarity of the muscular source, and ii) the number of sources detected by the signal separation technique will not be more than the number of signal electrodes; and c) processing means for processing signals received from the signal electrodes into digital signals suitable for application of the signal separation technique by the computer apparatus to separate the muscular source (signal processor 16 Figure 1A).

Regarding claims 2 and 11, Rosenburg discloses a method according to claim 1 and an apparatus according to claim 10 wherein the muscular activity is uterine activity (Column 7 lines 24-25).

Regarding claims 6 and 15, Rosenburg discloses a method according to claim 1 and an apparatus according to claim 10 wherein the step of placing the signal electrodes comprises placing four or five signal electrodes at and above navel height

with respect to an upright patient at positions close to the expected site of pacemaker activity (Figure 7B).

6. Claims 1, 7-10, and 16-18 are rejected under 35 U.S.C. 102(b) as being anticipated by WO 02/096288 A (Garfield et al.).

Regarding claim 1, Garfield et al. discloses a method of monitoring electrical muscular activity non-invasively (page 13 lines 7-9), the muscular activity being stationary or non-stationary, and the method including the steps of: a) providing a signal separation technique suitable for separating stationary signals (page 13 lines 23-26), b) placing a plurality of low-noise signal electrodes externally upon a patient's skin for detection of muscular activity (page 13 lines 7-9), the signal electrodes being localised sufficiently such that: i) their muscular signal contributions simulate a single muscular source to the signal separation technique despite any non-stationarity of the muscular source, and ii) the number of sources detected by the signal separation technique is not more than the number of signal electrodes; and c) applying the signal separation technique to signals received from the signal electrodes to separate the muscular source (page 13 lines 23-26).

Regarding claim 10, Garfield et al. discloses an apparatus for monitoring electrical muscular activity non-invasively, the muscular activity being stationary or non-stationary, the apparatus comprising: a) computer apparatus for implementing a signal separation technique suitable for separating stationary signals (filters/amplifiers 20 Figure 1 and computer 22 Figure 1), b) a plurality of low-noise signal electrodes for placing externally upon a patient's skin for detection of muscular activity (electrodes 17

Figure 1), the signal electrodes being suitable for localisation sufficiently such that: i) their muscular signal contributions will simulate a single muscular source to the signal separation technique despite any non-stationarity of the muscular source, and ii) the number of sources detected by the signal separation technique will not be more than the number of signal electrodes; and c) processing means for processing signals received from the signal electrodes into digital signals suitable for application of the signal separation technique by the computer apparatus to separate the muscular source (filters/amplifiers 20 Figure 1 and computer 22 Figure 1).

Regarding claims 7 and 16, Garfield et al. discloses a method according to claim 1 and an apparatus according to claim 10 wherein the signal electrodes are a first set of signal electrodes and the step of placing the signal electrodes includes placing a second set of signal electrodes upon the patient's skin in positions not localised sufficiently for their muscular signal contributions to simulate a single source to the signal separation technique, and wherein the signal separation technique employs signals derived via the first set of signal electrodes for monitoring non-stationary muscular activity and signals derived via the first and second sets of signal electrodes for monitoring stationary muscular activity (page 35 line 22 – page 36 line 8).

Regarding claims 8, 9, 17, and 18, Garfield et al. discloses a method according to claim 7 and an apparatus according to claim 16 for monitoring uterine activity wherein the signal separation technique simultaneously acquires maternal and fetal cardiac activity (page 36 line 4), and wherein the signal separation technique additionally

acquires uterine activity, maternal muscle activity, fetal ECG and maternal ECG (page 36 lines 1-4).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claims 5 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over McKeown et al. in view of "Blind Separation and Filtering Using State Space Models" (Cichocki et al.).

McKeown et al. disclose the method according to claim 4 and the apparatus according to claim 13. McKeown et al. do not expressly disclose that the step of applying the signal separation technique applies ICA to processing data derived from signals from the signal electrodes, the data being arranged in successive overlapping blocks such that in pairs of adjacent blocks each subsequent block incorporates a proportion of the data in the respective preceding block, and a correlation scheme is

applied to re-order independent sources derived in ICA processing of different blocks to correct for signal swapping. Cichocki et al. teach the use of the step of applying the signal separation technique applies ICA to processing data derived from signals from the signal electrodes, the data being arranged in successive overlapping blocks such that in pairs of adjacent blocks each subsequent block incorporates a proportion of the data in the respective preceding block, and a correlation scheme is applied to re-order independent sources derived in ICA processing of different blocks to correct for signal swapping (pages V-78 and V-79 Linear Demixing State Space Models). It would have been obvious to one having ordinary skill in the art at the time the invention was made to use such a step of applying the signal separation technique applies ICA to processing data derived from signals from the signal electrodes, the data being arranged in successive overlapping blocks such that in pairs of adjacent blocks each subsequent block incorporates a proportion of the data in the respective preceding block, and a correlation scheme is applied to re-order independent sources derived in ICA processing of different blocks to correct for signal swapping as taught by Cichocki et al. in the invention of McKeown et al. to provide the predictable result of having better processed and thus more accurate signals (Cichocki et al. Abstract and Introduction second paragraph).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Emily M. Lloyd whose telephone number is 571-272-

2951. The examiner can normally be reached on Monday through Friday 8:30 AM - 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Max Hindenburg can be reached on 571-272-4726. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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